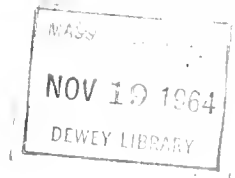
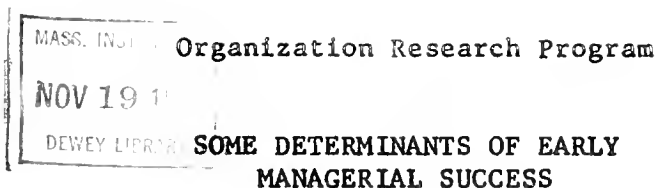




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David E. Berlew and Douglas T. Hall

August, 1964

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ABSTRACT

The purpose of the research was to explore the relationships among personal characteristics, process variables (i.e., situational and experiential factors), and early managerial success. Subjects were 49 college graduates, management-level employees of an operating company of the American Telephone and Telegraph Company.

The results indicate that the amount individuals contribute to an organization accounts for 52 per cent of the variance in their success at the end of five years, those contributions being influenced both by what the company expects, particularly in the first year, and to a lesser extent by personality factors.

It was concluded that process variables can be of great value in efforts to understand managerial success. The systematic analysis of events and experiences in the lives of managers promises to be a fruitful avenue of research.

The question of what makes a good manager is an old one, and it has been the subject of considerable research. In spite of this, we know relatively little about the ingredients of managerial success. One reason for this is a preoccupation with personal characteristics as opposed to situational and experiential factors. Personality factors certainly affect a man's success as a manager. However, observed relationships between specific personality variables and success have usually been weak and inconsistent, with the result that researchers have not been able to agree on a list of critical characteristics.

It would seem important to re-examine some of the assumptions that underlie most of the research in this area. For one thing, many research designs suggest that investigators have not had much regard for events, for what happens to a manager making his way in an organization. The nature of his job assignments (what is expected of him, his relationship with his boss, etc.), the frustrations he feels and the way he responds to them, and the types of successes he experiences are all things that happen to a manager, and it seems reasonable to expect them to be related to his eventual success or failure.¹

A second assumption that has been made, at least implicitly, is that people do not change radically. A good man always has been and always will be a good man, and a weak man will always be weak. Otherwise, why would investigators expect to find personal characteristics

¹ Studies by Graves (1962) and Kehrl (1960) provide support for this expectation

that will consistently predict success ten, twenty, and even thirty years in advance?

The purpose of this research is to test whether certain classes of events in the life of a young manager (which we shall call process variables) relate systematically to his success and whether these events are determined by, or act independently of, personality factors. No specific hypotheses were formulated. We did, however, anticipate that our process variables would show a very close relationship to managerial success, and that they would operate at least to some degree independent of personality characteristics.

METHOD

Subjects

The subjects are 49 management-level employees of an operating company of the American Telephone and Telegraph Company. They were all hired in 1956, most of them directly from college, although a few came from other companies. All subjects are college graduates, hired as management trainees.

Variables

Personal Variables. Personality data included psychologists' ratings, biographical information, and psychological test scores. They were collected by the staff of the American Telephone and Telegraph Company's Management Progress Study (MPS) at a series of three and one half day assessment centers held shortly after the men were hired in 1957. Operating much like a World War II O.S.S. assessment

center (cf., O.S.S. Assessment Staff, 1948), the MPS centers collected a variety of data through interviews and paper-and-pencil, projective, and situational tests.

During staff conferences held during the last half of each assessment week, subjects were rated on 25 personality variables, called Management Progress Variables. All available data were reviewed before the ratings were assigned.

The personal variables used in the present study were selected on an a priori basis from all those assessed by the MPS staff as the ones most relevant to managerial success. The 45 variables selected are listed in Table 1.

Process Variables. Two classes of process variables were used in this analysis. The first was Company Expectations. A list of eighteen categories was empirically formulated to reflect the variety of expectations or demands that an organization might have with regard to the behavior and attitudes of its managerial employees. These categories are presented in Table 1. The expectations of the company with respect to each employee were rated from 1 (low) to 3 (high) on each of the eighteen categories each year for the first five years of the employees's career. A Total Company Expectations score was obtained for each subject by summing his eighteen category scores for a particular year. A Cumulative Company Expectations score was computed by summing his Total Company Expectation scores for all five years.

The second class of process variables was Individual Contributions. These contribution ratings, again given for each of five years

TABLE 1

Personal and Process
Variables

PROCESS VARIABLES	PERSONAL VARIABLES	
<u>Individ. Conts. and Co. Expectations</u>	<u>Management Progress Variables</u>	<u>Biographical Data</u>
Technical Competence Learning Capacity Imagination Persuasiveness Group Membership Skills Communication Skills Supervisory Skills Decision-Making Organizing Ability Time-Energy Commitment Sacrifice of Autonomy Sociability Acceptance of Company Goals Self-Development Public Image Loyalty Productivity Initiative	Scholastic Aptitude Oral Communication Human Relation Skill Personal Impact Perception of Threshold Social Cues Creativity Self-Objectivity Social Objectivity Behavior Flexibility Need Approval of Peers Need Approval of Superiors Inner Work Standards Need Advancement Need Security Goal Flexibility Primacy of Work Bell System Value Orientation Realism of Expectations Tolerance of Uncertainty Ability to Delay Gratification Resistance to Stress Range of Interests Energy Organization and Planning Decision-Making	Age Birth Rank Childhood Health Number of jobs before Bell College Rating <u>Test Scores</u> School and College Ability Test (SCAT) - Verbal - Quantitative - Total Critical Thinking in Social Sciences - Raw Score - Company Quartile Rotter Incomplete Sentence Blank Edwards Personal Preference Schedule - Achievement - Endurance Guilford-Martin Test - General Activity - Ascendancy Submission - Masculinity Femininity - Inferiority Feelings - Nervousness Bass Opinion Questionnaire Current Events

and ranging from 1 to 3, reflect the company's evaluation of the subject's performance in each of the categories listed under Process Variables in Table 1. A Total Individual Contributions score is the sum of a subject's contributions scores for the eighteen categories in a single year. A Cumulative Individual Contributions score is the sum of a man's Total Individual Contribution scores for all five years.

The process data were obtained by coding yearly "Follow-up" and "In-company" interviews. The Follow-up Interview was a two-to three-hour interview with the subject, touching on areas such as job responsibilities, major sources of satisfaction or dissatisfaction, relationships with peers, subordinates, and superiors, career aspirations and strategies, salary treatment, major occurrences in the past year, significant aspects of personal life, and health. The interviews were conducted each year by consulting psychologists (often the same one) and are characterized by a high degree of openness and trust.

The In-company Interviews were held with some member of the company, usually a middle-management personnel man, in a position to present the company's evaluation of the subject's job performance. These interviews usually explored such topics as jobs the subject held in the preceding year, his division and division manager, his district and district manager, his immediate superior, his job responsibilities, and the company's (i.e., higher management's) evaluation of his contributions and assessment of his future with the company.

The interviews were coded for Company Expectations and Individual Contributions by two scorers after a month of training and a thorough intercoder reliability check. In twelve randomly chosen cases, the correlation coefficient for their sets of Total Company Expectation scores was .97. Their Total Individual Contributions scores also yielded an r of .97.

Success Criterion. The criterion of success used in the analysis was fifth-year salary, which ranged from \$7440 to \$11,400, with a standard deviation of \$971. Fifth-year salary was selected as the best available criterion measure for two reasons. First, it provided a relatively flat normal distribution of scores. Second, studies have indicated that salary, adjusted for length of service, is a satisfactory index of success in an organization (A.T.&T Personnel Research Section, 1962; Spitzer and McNamara, 1964). It is also worth noting that fifth-year salary correlated highly with fifth-year level or rank ($r = .72$, $p < .001$); and average yearly salary increase ($r = .82$, $p < .001$).

Relationships Studied. The basis of the present research was a comparison of the relationships between the frequently-studied personal variables and success and between the process variables and success. The relationship between the personal variables and the process variables was also tested to determine what effect the interaction of these two classes of variables has on success. The relationship between Total Individual Contributions and Total Company Expectations was studied to see which of these variables had the stronger effect on success. All of these relationships are illustrated in Figure 1.

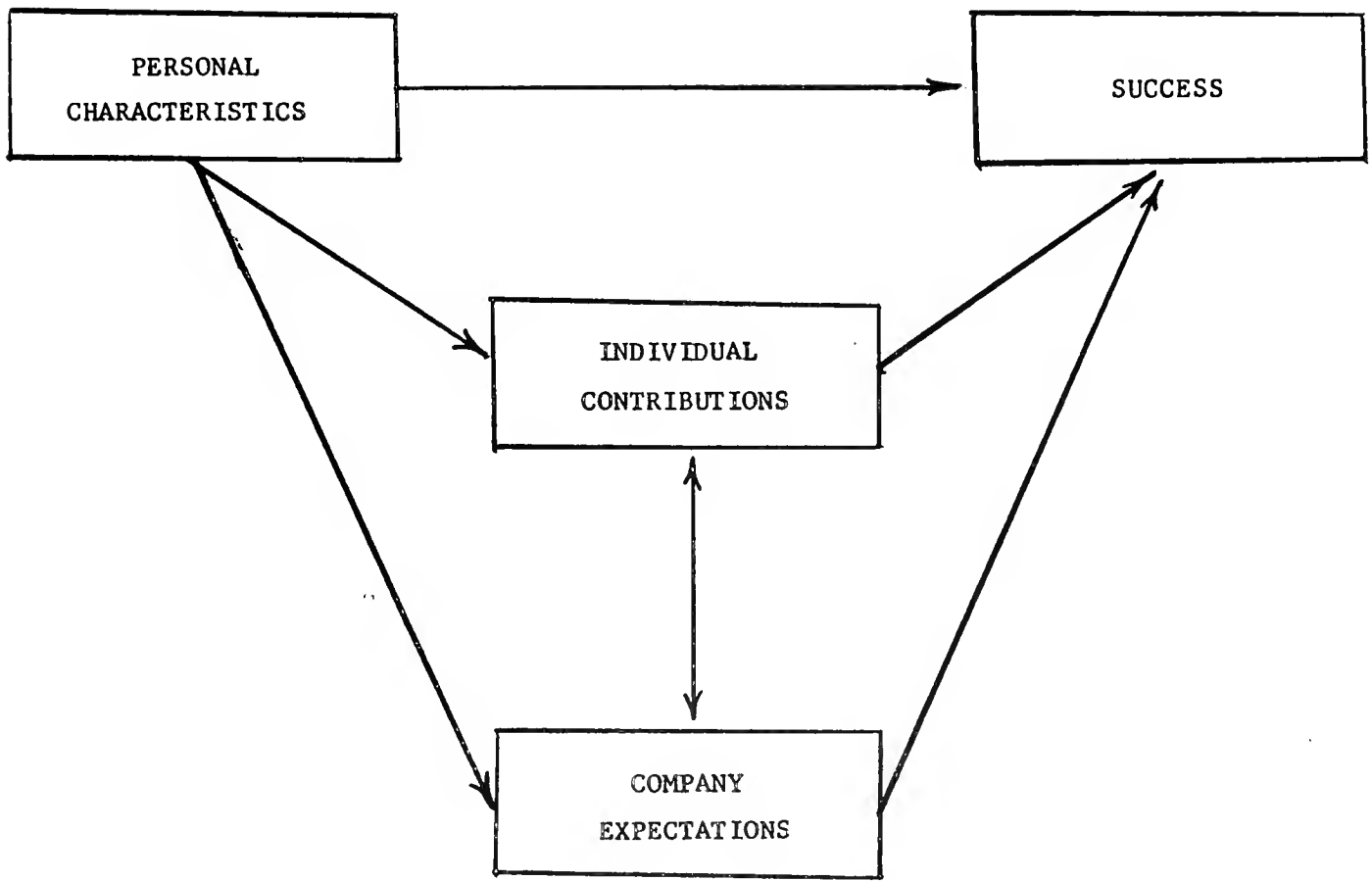


Figure 1. Possible interrelationships among personal variables, process variables, and success.

Insert
Figure 1
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RESULTS

Personal Characteristics and Success

Three of the 45 personal variables were significantly¹ correlated with the success criterion: Tolerance of Uncertainty ($r = .34$, $p < .01$), quartile² scores on the Critical Thinking in Social Science Test³ ($r = .40$, $p < .01$), and age ($r = .44$, $p < .01$). (See Appendix 1 for a complete list of the 45 correlation coefficients.) When all three of these variables were correlated jointly with the success criterion, the multiple correlation coefficient was .54.

Taken together, then, the three personal variables that correlated significantly with success accounted for 29 per cent of the variance in the success criterion.

¹ Because of the large number of variables used in the analysis, the criterion for statistical significance was set at $p < .01$ (one-tail).

² Quartile scores were derived from the distribution of scores of a sample of A.T.&T. operating company middle managers attending summer training programs.

³ Developed by the Educational Testing Service and designed to reflect an individual's ability to draw correct inferences from social science material, this test is considered to be a measure of applied intelligence.

Process Variables and Success

The correlations of Total Company Expectation and Total Individual Contributions scores for each of the five years with the success criterion are shown in Table 2. Also shown are correlations of Cumulative Individual Contributions and Cumulative Company Expectations scores with the success criterion.

The high correlation between first-year Total Company Expectations and success ($r=.53$, $p<.001$) and between first-year Total Individual Contributions and the success criterion ($r=.48$, $p<.001$), suggests that a large portion of the variance in the success criterion is accounted for by events in the first year of employment. However, the high intercorrelation of these two process variables ($r=.90$, $p<.001$) indicates that they are not affecting success independent of each other. The partial correlation of first-year Total Company Expectations with the success criterion, holding first-year Total Individual Contributions constant, is $.26$ ($p<.03$), while the partial correlation of first-year Total Individual Contributions with success, holding first-year Total Company Expectations constant, is $.003$. Therefore, it is the level of company expectations in the first year which plays the more important role in determining a man's success after five years.

Cumulative Company Expectations and Cumulative Individual Contributions correlate more highly with success ($r=.60$, $p<.001$; $r=.73$, $p<.001$, respectively) than any of the respective yearly scores. Since the two cumulative scores are highly intercorrelated ($r=.90$, $p<.001$), partial correlations were again computed to see how each related to success independent of the other. The partial correlation for Cumulative Individual Contributions and success, holding Cumulative Company Expectations constant, is $.52$, significant at the $.001$ level. However, when Cumulative Individual Contributions are held constant, there is an insig-

TABLE 2

Product-Moment Correlations of
Process Variables with the Success Criterion

Individual Contributions		Company Expectations	
First-Year Total	.48**	First-Year Total	.53**
Second-Year Total	.41*	Second-Year Total	.30
Third-Year Total	.64**	Third-Year Total	.43*
Fourth-Year Total	.64**	Fourth-Year Total	.48**
Fifth-Year Total	.65**	Fifth-Year Total	.54**
Cumulative	.72**	Cumulative	.60**

* $p < .01$ ** $p < .001$

nificant negative relationship ($r = -.16$) between Cumulative Company Expectations and the success criterion. This indicates that over the entire five-year period, a man's overall contribution, and not the amount expected of him, is the crucial factor in determining his success.

As time passes, then, it appears that the importance of the two process variables shifts. In the first year company expectations alone are independently related to success, whereas across all five years, only individual contributions show this relationship with the success criterion. The fact that individual contributions relate to success is not surprising -- in fact, it is reassuring -- but the meaning of the relationship between company expectations in the first year and later success is less clear. Are first-year company expectations important qua first-year expectations, or are they important because they influence how much a man will contribute during the next five years?

The possibility that first-year Total Company Expectations are important only because they influence Cumulative Individual Contributions is suggested by the strong relationship between these two variables ($r = .72$, $p < .001$). To test this hypothesis, two more partial correlations were computed. With the effects of first-year Total Company Expectations suppressed, the relationship between Cumulative Individual Contributions and success was still highly significant ($r = .59$, $p < .01$). However, when Cumulative Individual Contributions were held constant, the relationship between first-year Total Company Expectations and success was negligible ($r = .02$).

The relationship between the process variables and success now becomes clear. First-year expectations are strongly related to success, but only to the extent that they increase the probability of a strong performance (i.e., high contributions) over the next five years. First-year company expectations are important but not sufficient; they influence how much a man will contribute in subsequent years, but his level of contributions will largely determine his degree of success.

Personal Characteristics and Process Variables

So far, the results indicate much stronger relationships between the process variables and success than between personal variables and success. This does not necessarily mean that personal qualities are irrelevant to managerial success. It is possible, for example, that personal characteristics determine which management candidates will receive challenging (i.e., high expectation) first assignments, or that certain personality and background factors will enable a person to turn in a high contribution performance. However, the weak relationship between personal variables and the success criterion suggests that such relationships between personal and process variables, if they exist, must be relatively weak.

The correlations between the personal variables and both first-year Total Company Expectations and Cumulative Individual Contributions were computed. None of the 45 personal variables correlates significantly with first-year Total Company Expectations. (See Appendix 2 for these correlations.) The correlations of the personal variables with Cumulative Individual Contributions are presented in Table 3. Three personal variables correlate significantly with Cumulative Indi-

TABLE 3

Product-Moment Correlations of
Personal Variables with Cumulative Individual Contributions

VARIABLE	r	VARIABLE	r
<u>Management Progress Variables</u>		<u>Biographical Data</u>	
Scholastic Aptitude	.09	Birth Rank	-.29
Oral Communication Skill	.21	Age	.32
Human Relations Skill	.14	Childhood Health	-.01
Personal Impact	.10	Number of Jobs before	
Perception of Threshold		Bell	.26
Social Cues	.23	College Rating	.05
Creativity	.24		
Self-Objectivity	.15	<u>Test Scores</u>	
Social Objectivity	.09	SCAT results	
Behavior Flexibility	-.01	- Verbal	.22
Need Approval of		- Quantitative	.16
Superiors	-.03	- Total	.24
Need Approval of Peers	-.06	CTSS results	
Inner Work Standards	.35*	- Raw Score	.10
Need Advancement	.36*	- Quartile	.30
Need Security	-.27	Rotter Incomplete	
Goal Flexibility	-.09	Sentence Blank	-.04
Primacy of Work	.22	Edwards Personal Preference	
Bell System Value		Schedule	
Orientation	.03	+ Achievement	.14
Realism of Expectations	.02	+ Endurance	-.05
Tolerance of Uncertainty	.35*	Guilford-Martin	
Ability to Delay		- General Activity	.13
Gratification	-.27	- Ascendancy	
Resistance to Stress	.16	Submission	.17
Range of Interests	.23	- Masculinity	
Energy	.29	Femininity	.26
Organization and		- Inferiority	
Planning	.26	Feelings	.24
Decision-Making	.03	- Nervousness	.05
		Bass Opinion Questionnaire	.02
		Current Events	.08

*p<.01

vidual Contributions at the one per cent level: Inner Work Standards ($r=.35$), Need Advancement ($r=.36$), and Tolerance of Uncertainty ($r=.35$). It is noteworthy that of the three personal variables that correlate significantly with success, only one (Tolerance of Uncertainty) also correlates significantly with Cumulative Individual Contributions. This raises the question as to whether certain personality characteristics affect success independent of contributions or performance level.

An examination of Table 3 will reveal that the two remaining personal variables that correlated with success, Critical Thinking quartile scores and age, show a substantial although not statistically significant correlation with Cumulative Individual Contributions. To explore the possibility that certain personality variables may lead to success regardless of an individual's contributions, three partial correlations were computed. With the effects of Cumulative Individual Contributions suppressed, the correlation of success with Tolerance of Uncertainty is .14, with Critical Thinking quartile scores is .23 ($p<.03$), and with age is .30 ($p<.02$).

The relationship between Tolerance of Uncertainty and success is due largely to the fact that the ability to produce under uncertain or unstructured conditions is related to how much a man contributes during his first five years in the organization, and contributions are in turn related to his success. It is interesting, however, that both age and a measure of applied intelligence relate to success quite independently of contributions or performance level.

The relationship between age and success can be explained. The important factor is probably not age itself, but all of the age-related background factors that would add to a man's ascribed status: military service, previous work experience, family obligations, graduate

education, etc. Taken individually none of these variables relates significantly to success, but their joint effect is probably responsible for the high correlation between age and success.

The relationship between Critical Thinking quartile scores and success, independent of contributions, is less easily explained. Perhaps the practical or applied intelligence of an employee is sufficient to impress higher management, even if this intelligence does not lead to high contributions.

To summarize, the results indicate that personal characteristics do not play a major role in determining the degree to which the trainee's first job is challenging or demanding. However, these characteristics do play a larger role in determining how much a man will contribute over five years. To a lesser extent, they affect an individual's success after five years regardless of how much he has contributed.

It is noteworthy that personal qualities relate somewhat more strongly to an index of performance than to an index of success. However, we must assume that this is at least partly the result of using fifth-year salary as the best available index of success; because of an expected lag between contributions and rewards, unusually high contributions during the fourth or fifth years of employment probably are not rewarded with exceptional salary increases until the sixth or seventh year.

DISCUSSION

The purpose of this study was to test for relationships among process variables, personal variables, and success (see Figure 1). The important relationships, as revealed by our analysis, are illustrated in Figure 2.

Insert
Figure 2
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In our sample, 52 per cent of the variance in success is due to differences in Cumulative Individual Contributions. Good performance tends to be rewarded by high salary, whereas poor performance is not so rewarded.

There is also a significant relationship between what the company expects of a man in his first year and his later success. This relationship persists when the effect of contributions in the first year is eliminated, but disappears when contributions across all five years are held constant. Thus, it appears that a challenging job in the first year is important only to the extent that it motivates a man to contribute a strong performance in later years.

Three personal variables, age, Tolerance of Uncertainty, and Critical Thinking in Social Science Test quartile scores, correlate significantly with the success criterion, together accounting for 29 per cent

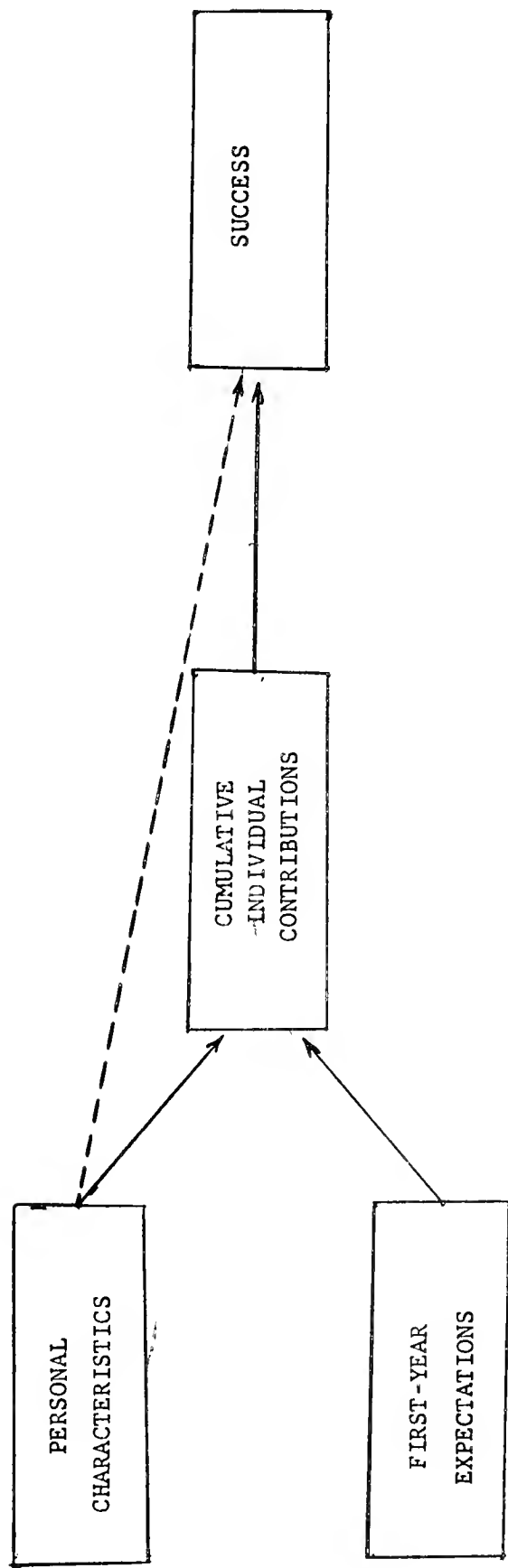


Figure 2. Observed relationships among process variables, personal variables, and success.

of the variance in success. However, these correlations become lower when contributions are held constant. Therefore, although they affect success directly to a certain extent, these personal variables also operate through the cumulative contributions variable. This suggests that a man's personal characteristics affect his success, but largely to the extent that they enable him to turn in a strong managerial performance.

Three personal variables (all Management Progress Variables) correlate significantly with contributions across all five years; these correlations indicate that men with high work standards and a strong need to be promoted ahead of their peers, and who function well under uncertain or unstructured conditions, tend to sustain high levels of performance.

Cumulative Individual Contributions is the intervening variable that mediates between the personal variables and success and between first-year Total Company Expectations and success. Neither personal characteristics nor a challenging first-year job will lead to success independent of the amount a man contributes over five years.

Speaking more generally, it appears that motivational factors play a major role in determining the amount a man will contribute in his first five years with an organization. Company expectations are important because they provide strong external motivation for the young manager. High correlations (ranging from .80 to .90) exist between company expectations and individual contributions in any given year; a man tends to produce what is expected of him.

Undoubtedly, these expectations also create strong internal motiva-

tion through the process of socialization. If in his first job with the company, the young manager learns that performance standards are high, that a great deal is expected of him, he may internalize these standards and work to live up to them even when he is assigned to less challenging jobs later in his career.

The three personal variables that correlated significantly with cumulative contributions also involve aspects of internal motivation. It is reasonable to assume that Need for Advancement and Inner Work Standards both lead to strong performance; Tolerance of Uncertainty should enable a man to sustain a high performance level under unstructured or uncertain conditions.

These results have rather clear implications for personal policy. Intelligence and motivation appear to stand out as factors relating to strong managerial performance and success; certainly these variables should be given considerable weight in any selection program. Even more important, however, is the assignment of candidates to highly challenging jobs during their first year with the company.¹

The .72 correlation between how much a company expects of a man in his first year and how much he contributes during the next five years is too compelling to ignore.

¹ Before this research was undertaken, the Bell System instituted the Initial Management Development Program, designed to insure that all managerial candidates have highly challenging jobs, particularly during their first years with the organization.

APPENDIX 1

Product-Moment Correlations of Personal Variables with the Success Criterion (Fifth-Year Salary)

VARIABLE	r	VARIABLE	r
<u>Management Progress Variables</u>		<u>Biographical Data</u>	
Scholastic Aptitude	.11	Age	.44*
Oral Communication Skill	.12	Birth Rank	-.19
Human Relations Skill	.13	Childhood Health	-.19
Personal Impact	.13	Number of Jobs before Bell	.25
Perception of Threshold Social Cues	.25	College Rating	.24
Creativity	.22		
Self-Objectivity	-.01	<u>Test Scores</u>	
Social-Objectivity	.08	SCAT results	
Behavior Flexibility	.04	- Verbal	.22
Need Approval of Superiors	.03	- Quantitative	.25
Need Approval of Peers	.13	- Total	.30
Inner Work Standards	.23✓	CTSS results	
Need Advancement	.16	- Raw Scores	.11
Need Security	-.20	- Quartile	.40*
Goal Flexibility	.01	Rotter Incomplete Sentences Blank	-.05
Primacy of Work	.14	Edwards	
Bell System Value Orientation	-.05	- Achievement	.17
Realism of Expectations	.03	- Endurance	.02
Tolerance of Uncertainty	.34*	Guilford-Martin	
Ability to Delay Gratification	-.17	- General Activity	.07
Resistance to Stress	.14	- Ascendancy	.07
Range of Interests	.28	Submission	.07
Energy	.04	- Masculinity	.15
Organization and Planning	.25	Femininity	.11
Decision-Making	.09	- Inferiority	-.13
		Feelings	.09
		- Nervousness	.17
		Bass Opinion Questionnaire	
		Current Events	

* $p < .01$

APPENDIX 2

Product-Moment Correlations of Personal Variables with First-Year Total Company Expectations

VARIABLE	r	VARIABLE	r
<u>Management Progress Variables</u>		<u>Biographical Data</u>	
Scholastic Aptitude	.13	Age	.27
Oral Communication Skill	.14	Birth Rank	-.01
Human Relations Skill	.18	Childhood Health	-.06
Personal Impact	-.01	Number of Jobs before Bell	.16
Perception of Threshold of Social Cues	.23	College Rating	.00
Creativity	.15	<u>Test Scores</u>	
Self-Objectivity	.13	SCAT results	
Social Objectivity	.15	- Verbal	.22
Behavior Flexibility	.01	- Quantitative	.06
Need Approval of Superiors	.03	- Total	.17
Need Approval of Peers	-.01	CTSS results	
Inner Work Standards	.27	- Raw Score	.15
Need Advancement	.12	- Quartile	.32
Need Security	-.16	Rotter Incomplete Sentences Blank	.05
Goal Flexibility	.03	Edward results	
Primacy of Work	.14	- Achievement	.08
Bell System Value Orientation	.06	- Endurance	-.05
Realism of Expectations	.01	Guilford-Martin	
Tolerance of Uncertainty	.25	- General Activity	.13
Ability to Delay Gratification	-.10	- Submission	
Resistance to Stress	.16	Ascendancy	.06
Range of Interests	.26	- Masculinity	
Energy	.22	Femininity	.08
Organization and Planning	.21	- Inferiority	
Decision-Making	.09	Feelings	.07
		- Nervousness	-.12
		Bass Opinion Questionnaire	-.12
		Current Events	.24

* $p < .01$

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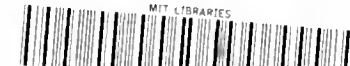
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